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some mineral slices will prove to be very fragile on account of their thinness. Sections which are made of a rock material which needed a preliminary treatment with Canada balsam to make it firmer would break entirely to the smallest fragments in the attempt to remove them to another glass, and have therefore to remain on their original glass. Before covering them, the greatest care should be taken to free them entirely from any Canada balsam around the borders of the mineral section, and also from emery, which sometimes can only be detected by aid of a magnifying glass. The re-mounted mineral slice, or the one which could not be removed, as stated above, is covered with a few drops of Canada balsam and laid again upon the warm slab till the balsam has obtained the required tenacity. A thin cover-glass, corresponding in size with the mineral slice is cleaned with alcohol and warmed; it is then taken up with a pair of forceps and dropped slopingly on the slice so as to exclude any air. The section is left on the warm slab till all air bubbles have disappeared which may have been enclosed between the section and cover-glass; the latter is gently pressed upon the section and then allowed to cool. Care should be taken to place the mineral slice and cover-glass in the centre of the glass slide, which will contribute to a nice appearance of the finished preparation. The surplus of Canada balsam around the cover-glass is cleared off by brushing it with turpentine, then it is well rinsed with water and after being dried it should be labeled at once. The labels should be applied on both sides of the preparation and inscribed with the name and locality and geological group of the prepared material. It is well to number the sections and record them in a catalogue in which also a description of the most interesting and principal features of each mineral slice may be given, which will facilitate a future study of the section.

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## THE SERPENT AND THE APE.

BY ARTHUR E. BROWN.

WITH the purpose of observing the manner in which the feelings of curiosity and astonishment are manifested in the monkey, Mr. Darwin once introduced a snake into a cage containing a number of those animals, and the results of his experi-

ment he refers to in "The Descent of Man," and also in "The Expression of the Emotions in Man and Animals," as illustrative of the extent to which those qualities are developed in that branch of the animal kingdom.

Reading his statement, the writer conceived the idea that the results obtained were capable of a deeper application than was then given them, and he proceeded to try the experiment for himself. The Monkey House at the Philadelphia Zoological Garden afforded the opportunity, so a dead snake was coiled up in a newspaper, the corners of which were twisted together in such a manner that they would readily come undone, and the package was then set on the floor of a cage containing forty or fifty monkeys of a great variety of species. It was instantly spied by a female *Cynocephalus*, who was the principal leader in all the pranks with which the monkeys constantly amused themselves; she seized the paper by one corner, and set off across the cage, dragging it behind her, evidently intending to have a good time with it.

Before she had gone more than a few feet, the paper became unfolded, and the snake slipped partly out. She instantly dropped the paper and sidled off in a very comical manner with her head over her shoulders, keeping an eye behind her, much as Lot's wife must have looked back on the fascinating terrors of the cities of the plain. No sooner did the rest of the monkeys perceive the dreadful object in their midst, than they approached, step by step, and formed in a circle of six or eight feet diameter, having for its centre the snake quietly coiled up on the floor. None dared, however, to touch it or to go beyond the established line of safety, with the exception of one large Macaque, the acknowledged leader of the cage, who cautiously approached and made an occasional snatch at the paper, apparently to see if the enemy was really as devoid of life as it appeared to her; all the others, meanwhile looking on in breathless attention.

At this point, a string which had previously been attached to the tail of the snake was gently pulled. The serpent lengthened slightly, and the monkeys fled up the sides of the cage, chattering and screaming like magpies; when they got to a safe distance they halted for observation, and after some moments, seeing no further sign of danger, they gradually returned, one by one, to their former position—the large ones in the front rank, and the smaller ones, crowded out by superior strength, forming behind and looking over their shoulders.

This was continued for some hours without the slightest change in the disposition of the monkeys—all of their actions showing a most intolerable fear of the snake, mingled with an attraction or curiosity which would not allow them to remain away from it. This was so universal that not one of the monkeys in the cage was entirely free from it.

The snake was finally taken out, and several other animals belonging to the same class were put in its place, but with very different results. Of a tortoise, for instance, and a small dead alligator, they were at first rather shy, but they at length began to touch them, and in ten minutes they were playing with them, and passing them from one to another with the greatest curiosity.

The same snake was then shown, in turn, to animals belonging to a number of other orders: Carnivores, Rodents, Ungulates, Edentates and Marsupials, but none of them paid it any special attention with the exception of a Peccary (*Dicotyles labiatus*), which, finding it to be dead, seemed disposed to make a meal of it.

Turning from the monkeys and watching, instead, the visitors to the Reptile House, it is evident that the instinctive fear and horror of the snake which is so common as to be almost universal with man, is closely allied to that which has been seen to exist among monkeys. Women readily develop this, as their emotions are more quickly responded to by gestures, than is usually the case in the other sex, and I was specially fortunate, a short time after the occurrence detailed above, in having an opportunity of observing the effect produced by the collection of snakes, upon a lady who was deaf and dumb—by the fact of her disabilities she was shut out, to a very great extent, from the influence—repressing, so far as the expression of the emotions is concerned—of free association with others, and the nature of her feelings was thereby rendered more evident. I was not at all surprised to trace in her, actions and gestures which resembled closely those which I had observed on the part of the monkeys; they evidenced the same fear, the same attraction and the same repulsion, and after watching for a long time, with an expression of the most intense disgust, the cage of Boas, she was at last led away by her friends, protesting that she wanted to stay.

Now if it be asked why this instinctive feeling should be developed in the *Primates* alone—it is probable that as the early dawnings of intelligence in the common ancestor of man and

monkeys began to surpass the power of receiving impressions which existed in other animals, he would be most liable to conceive great dread of that enemy which inflicted upon him wounds of a very different sort from those which he received from his own kind or from animals which approached more or less to his own form, and which also produced effects so subtle in their character and operation, that they would be apt to leave lasting impressions on those animals which were frequently subjected to witnessing them. It should be remembered, also, that the home of the monkey and the spot where, in all probability, the earlier *Primates* first saw the light, is in those regions of the earth which are most infested by numerous and venomous serpents.

These facts will at once suggest to all who put their faith in the theory of gradual development, that the fear of the serpent became instinctive in some far distant progenitor of man, by reason of his long exposure to danger and death in a horrible form, from its bite, and that it has been handed down through the diverging lines of descent which find their expression to-day in *Homo* and *Pithecius*. How strongly marked it is in the latter, the experiment detailed above, corresponding in each of its results with that of Mr. Darwin, bears testimony; and for the evidence of its influence on the mind of the former, turn to the story of the serpent in Paradise; to the signs and symbols of many ancient mythologies, and to the feeling which few men can deny to themselves when they are brought into association with even the most beautiful and harmless member of the order *Ophidia*.

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## TRACES OF SOLAR WORSHIP IN NORTH AMERICA.

BY EDWIN A. BARBER.

In an article published in the October NATURALIST, entitled "On the Ancient and Modern Pueblo Tribes of the Pacific Slope of the United States," the writer made use of the following expression: "Both paid homage to the sun, or at least looked for a Messiah daily to come to them from the east," to which assertion exceptions have been taken by some ethnologists.

It is held by this class of scientists that the heavenly bodies were never deified by any of the American races. Granting this to be, in some degree, true: That the luminaries, collectively